

EX: if  $d_1: X^2 + y^2 - 4X - 4y + 4 = 0$

$$d_2: X^2 + y^2 + 6X + 6y + 9 = 0$$

are two elements of a family of circle with common axis. Find its, two limit pts and the R.A of this family

$$R.A. = d_2 - d_1 = 0$$

$$10X + 10y + 5 = 0$$

$$2X + 2y + 1 = 0 \quad \#$$

$$d_1 + \lambda R = 0$$

$$\text{Family: } X^2 + y^2 + (-4 + 2\lambda)X + (-4 + 2\lambda)y + (4 + \lambda) = 0 \quad \#$$

$$\text{Centre: } (-1 + \lambda, -1 + \lambda)$$

$$R^2 = 2(2 - \lambda)^2 - (4 + \lambda) = 0$$

$$\lambda = \frac{1}{2}, \lambda = 4$$

$$\text{L. pts are: } \left(\frac{3}{2}, \frac{3}{2}\right) \& (-2, -2)$$



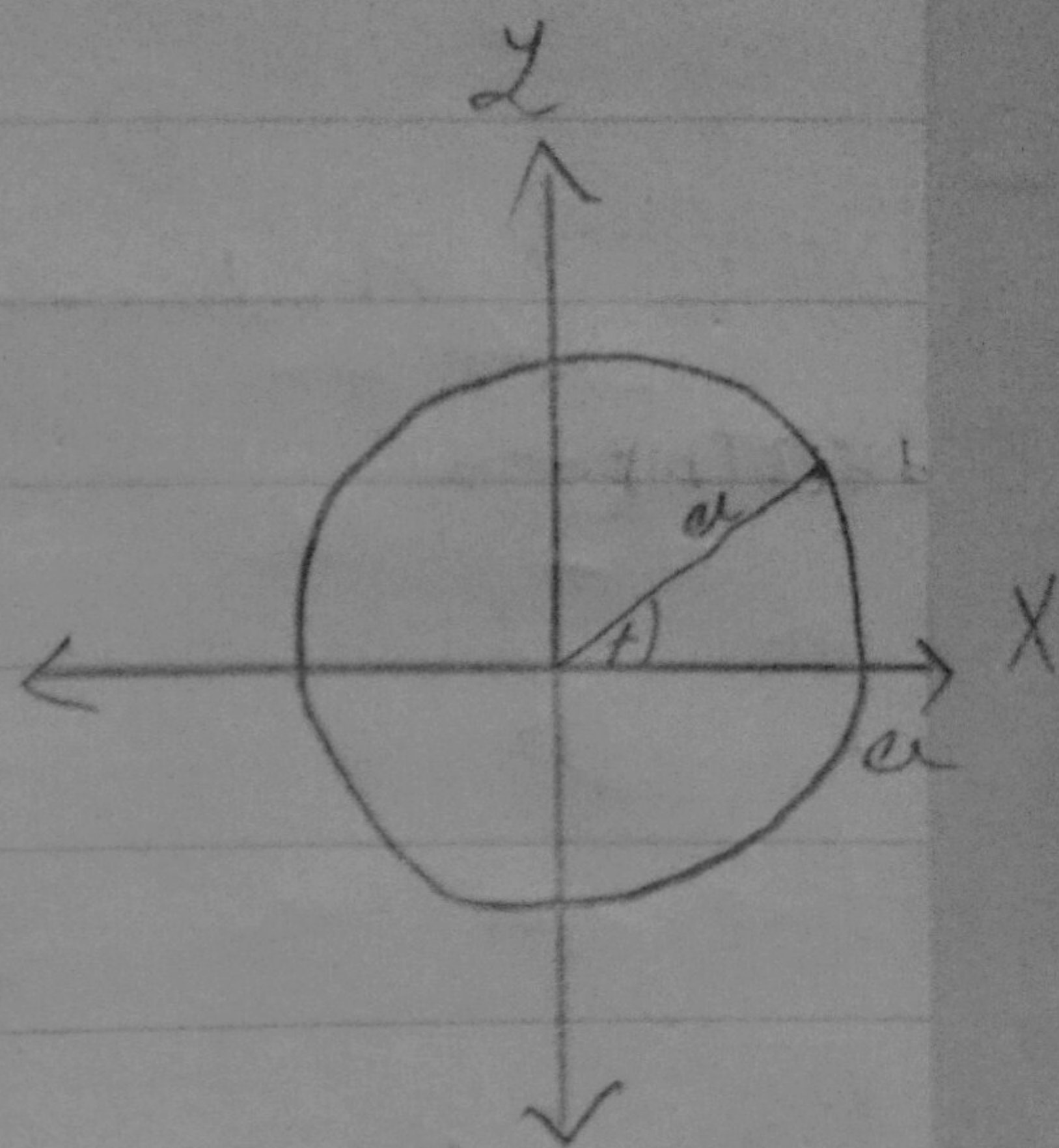
Parametric eqn of The circle :

Consider The circle  $x^2 + y^2 = a^2$

$$x = a \cos t$$

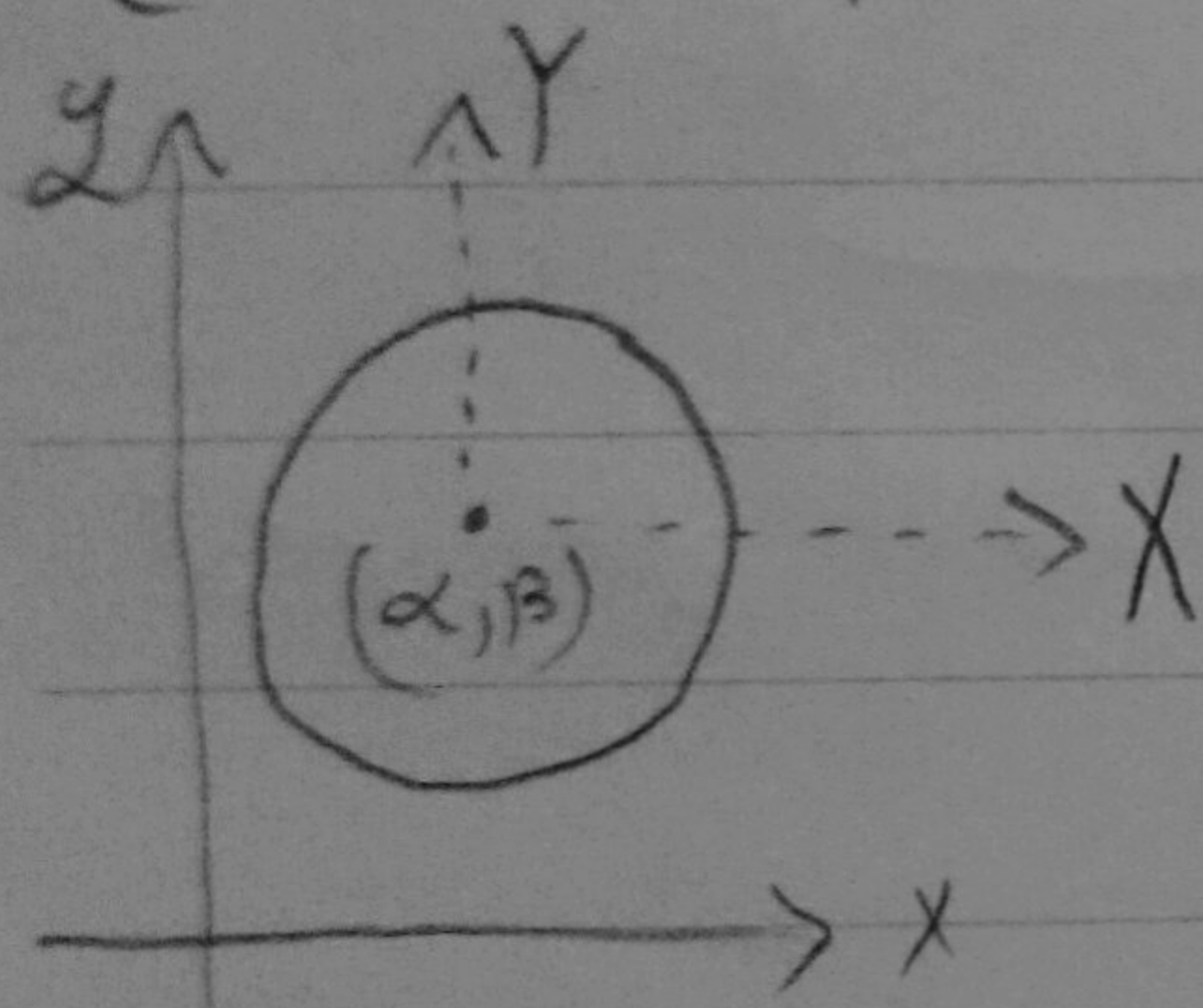
$$, 0 \leq t < 2\pi$$

$$y = a \sin t$$



---

$$(x - \alpha)^2 + (y - \beta)^2 = a^2$$

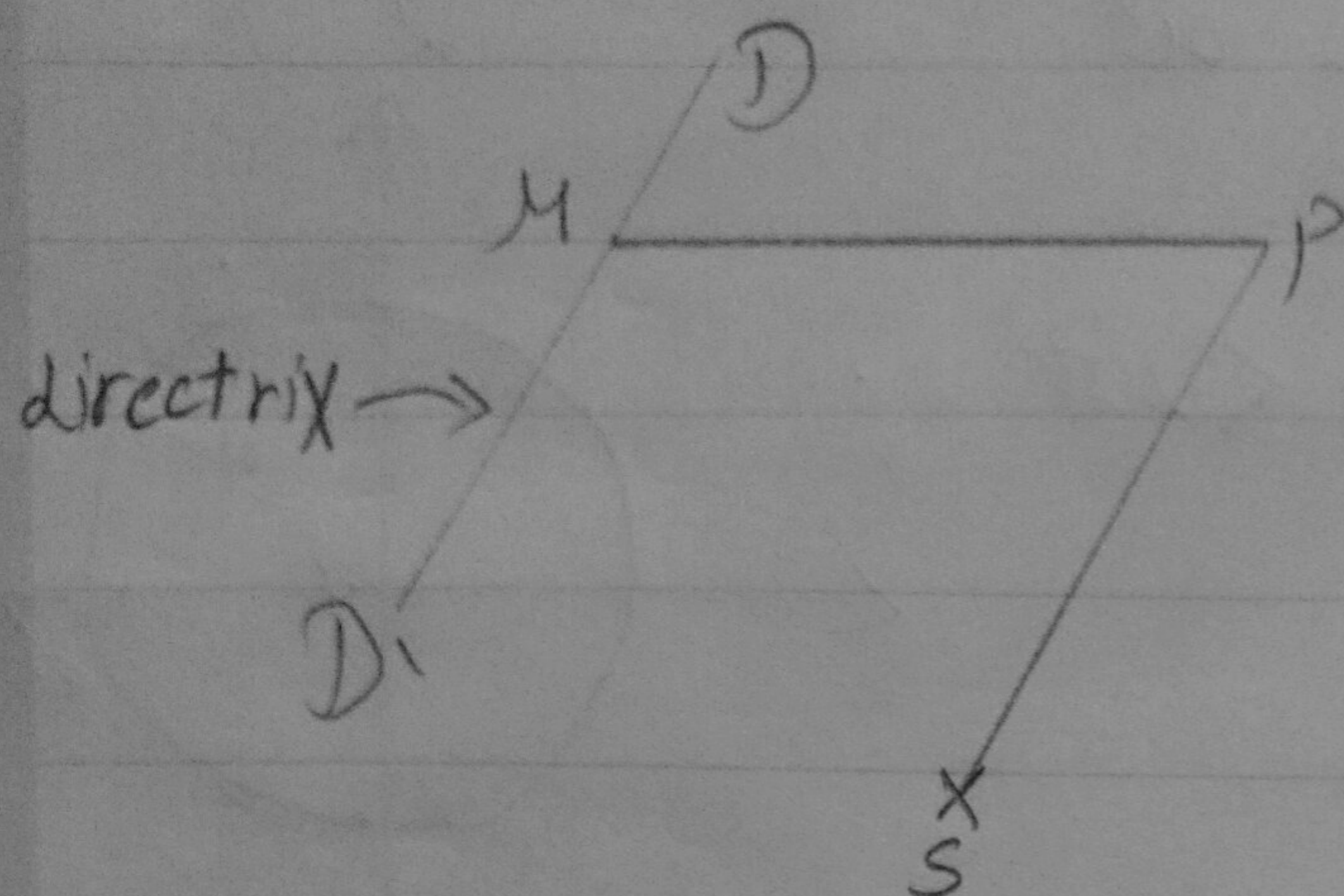


$$x - \alpha = a \cos t$$

$$y - \beta = a \sin t \quad \#$$



# Conic Sections



$$\frac{PS}{PM} = e = \text{Constant}$$

eccentricity / معامل الانحراف الموكن للقطع

if  $e = 1 \Rightarrow$  parabola

$e < 1 \Rightarrow$  ellipse

$e > 1 \Rightarrow$  hyperbola

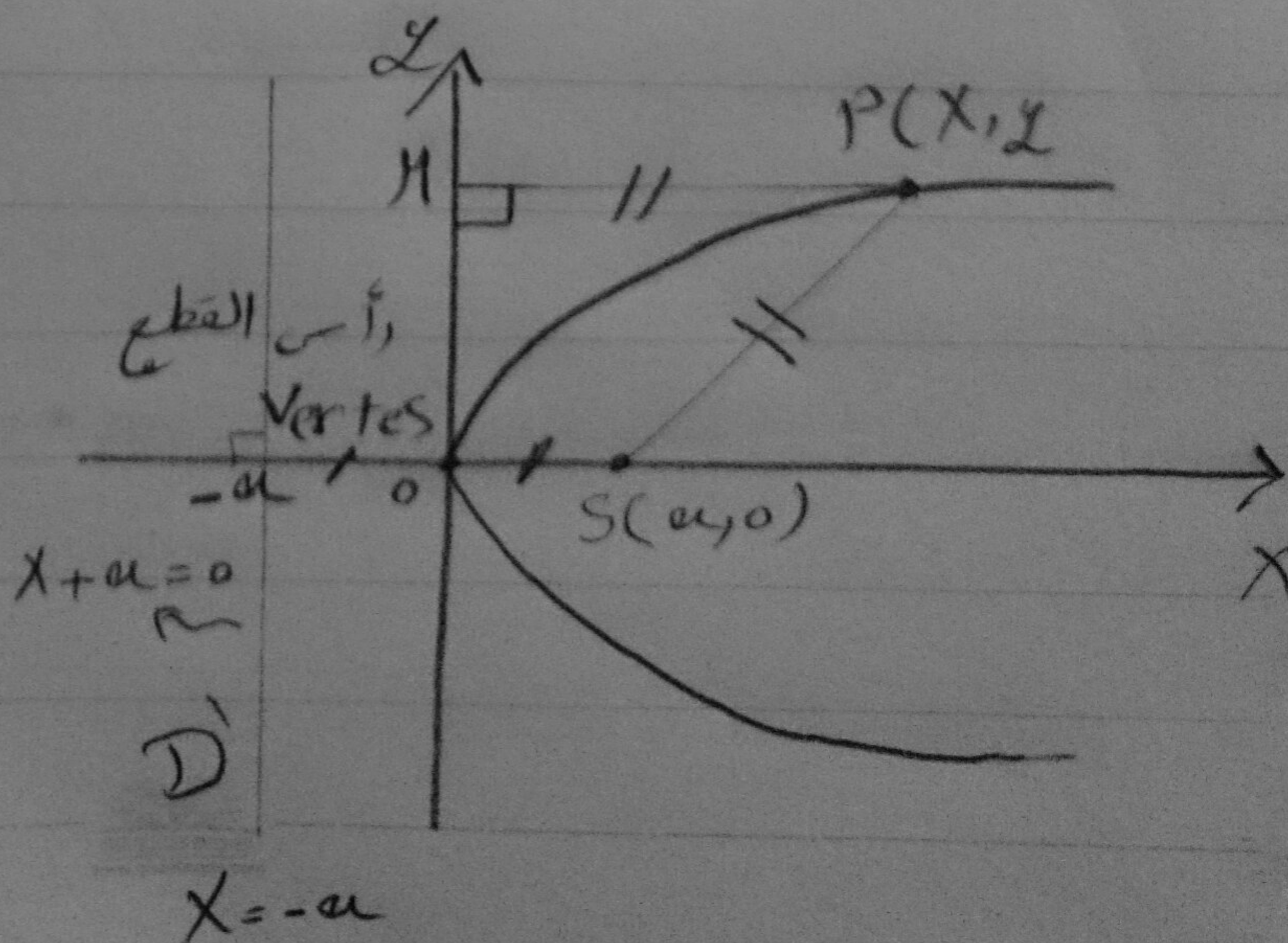
The parabola  $e = 1$

Standard eqns

القطاعات المكافئة

الصور القياسية

\* محور القطع داخل القطع  
وعلى محور



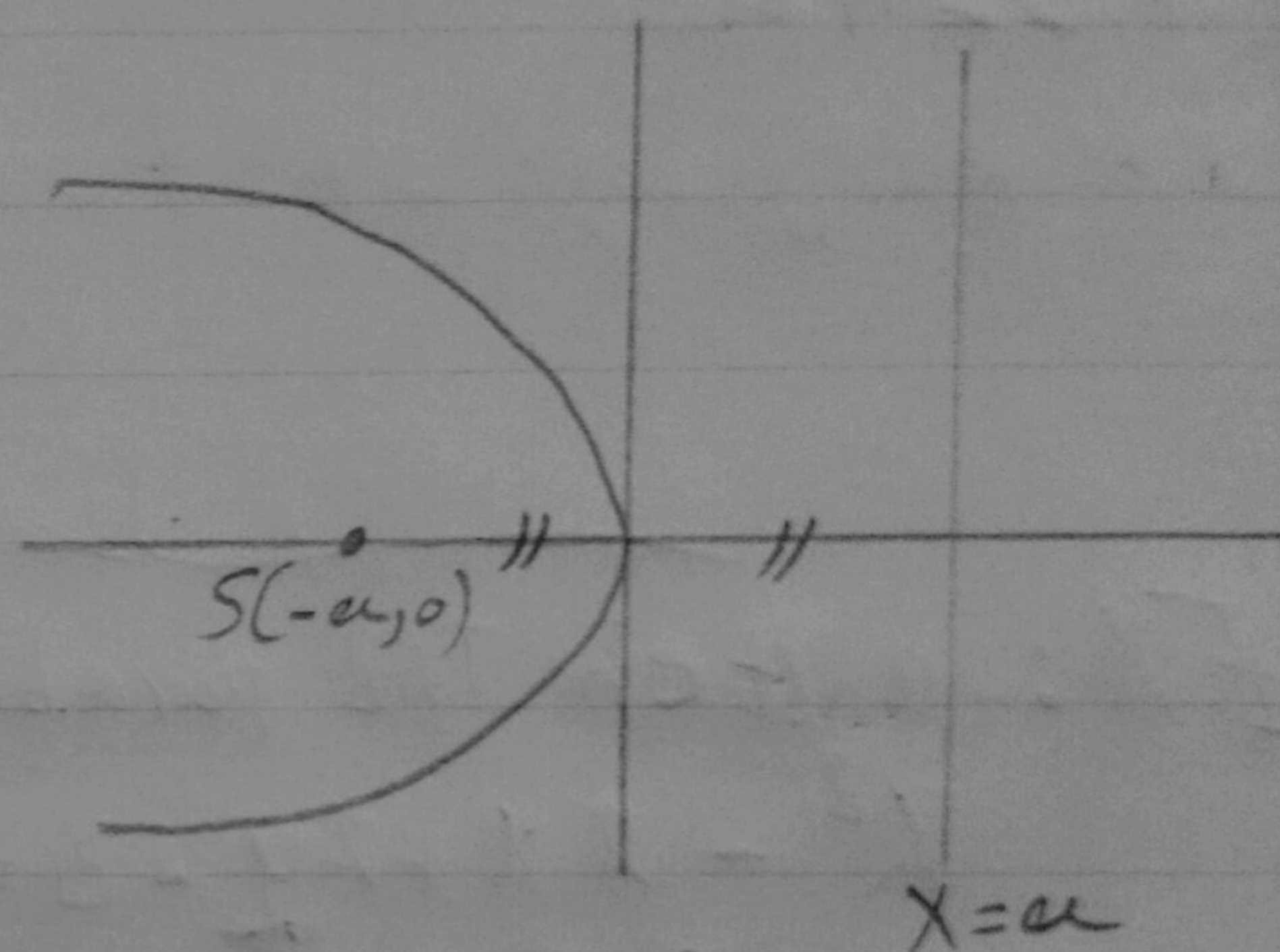


$$\overline{PS}^2 = \overline{PM}^2$$

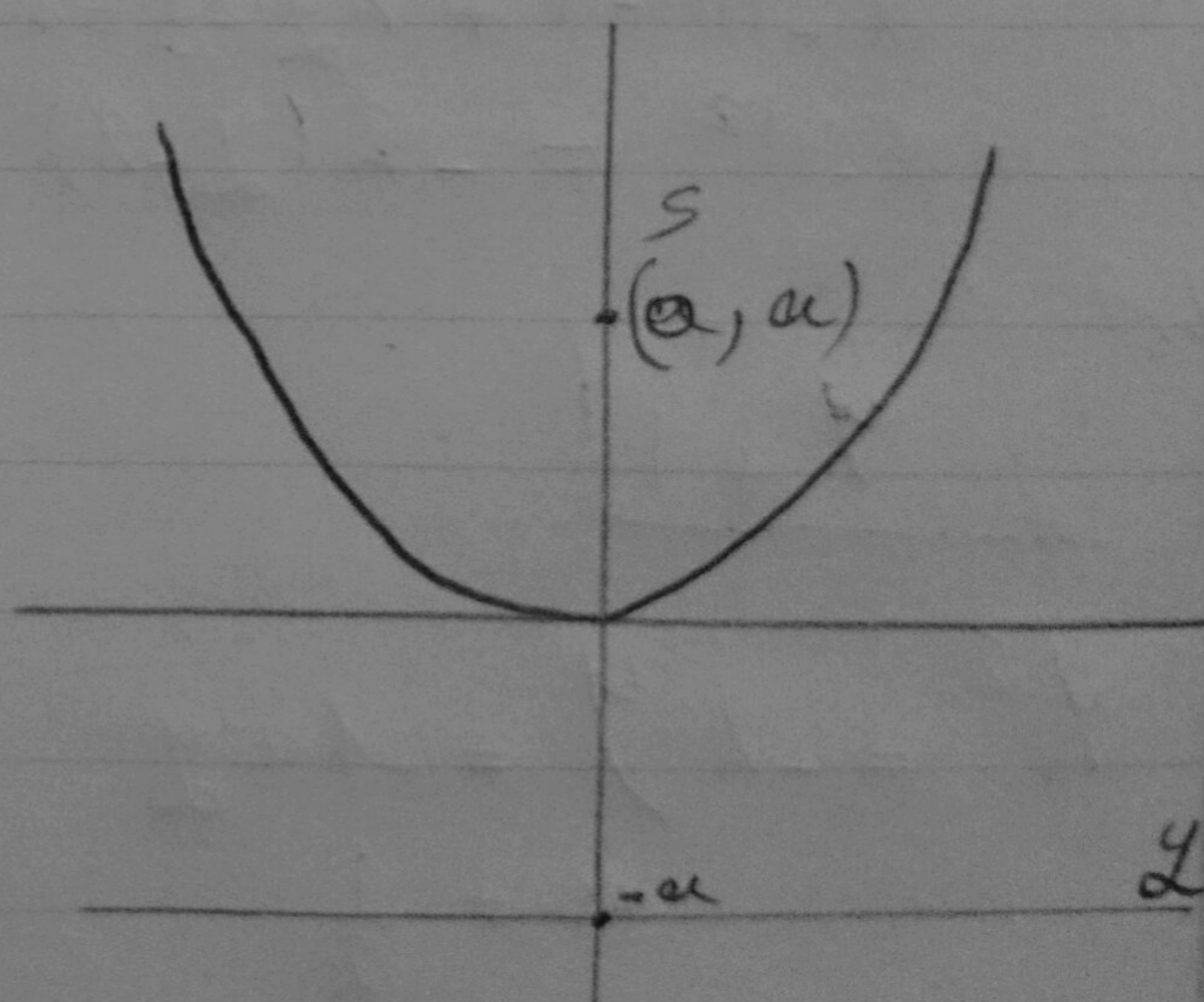
$$(X-a)^2 + (y-0)^2 = \frac{(X+a)^2}{1^2+0^2}$$

$$y^2 = 4ax$$

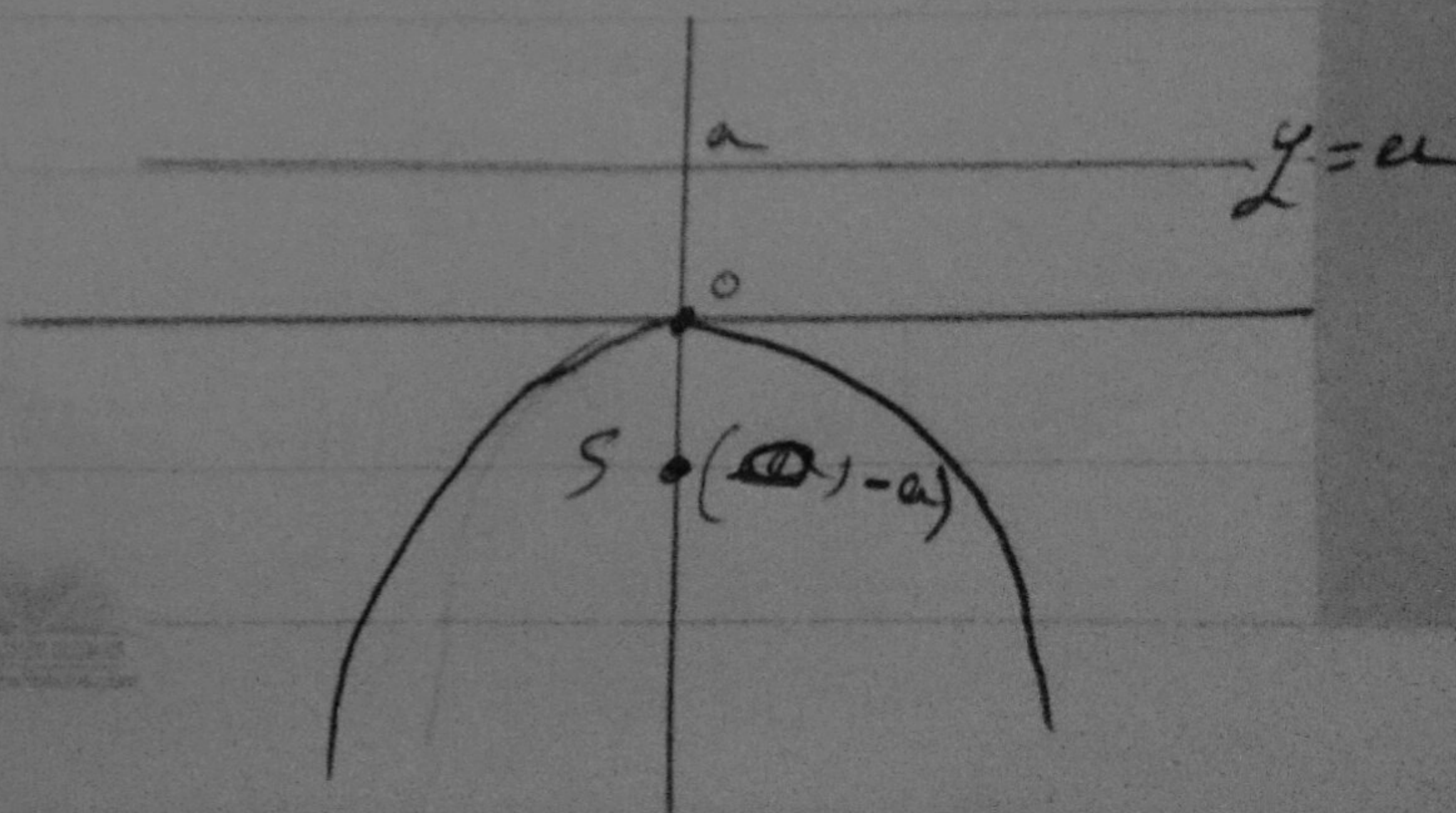
$$y^2 = -4ax$$



$$x^2 = 4ay$$



$$x^2 = -4ay$$



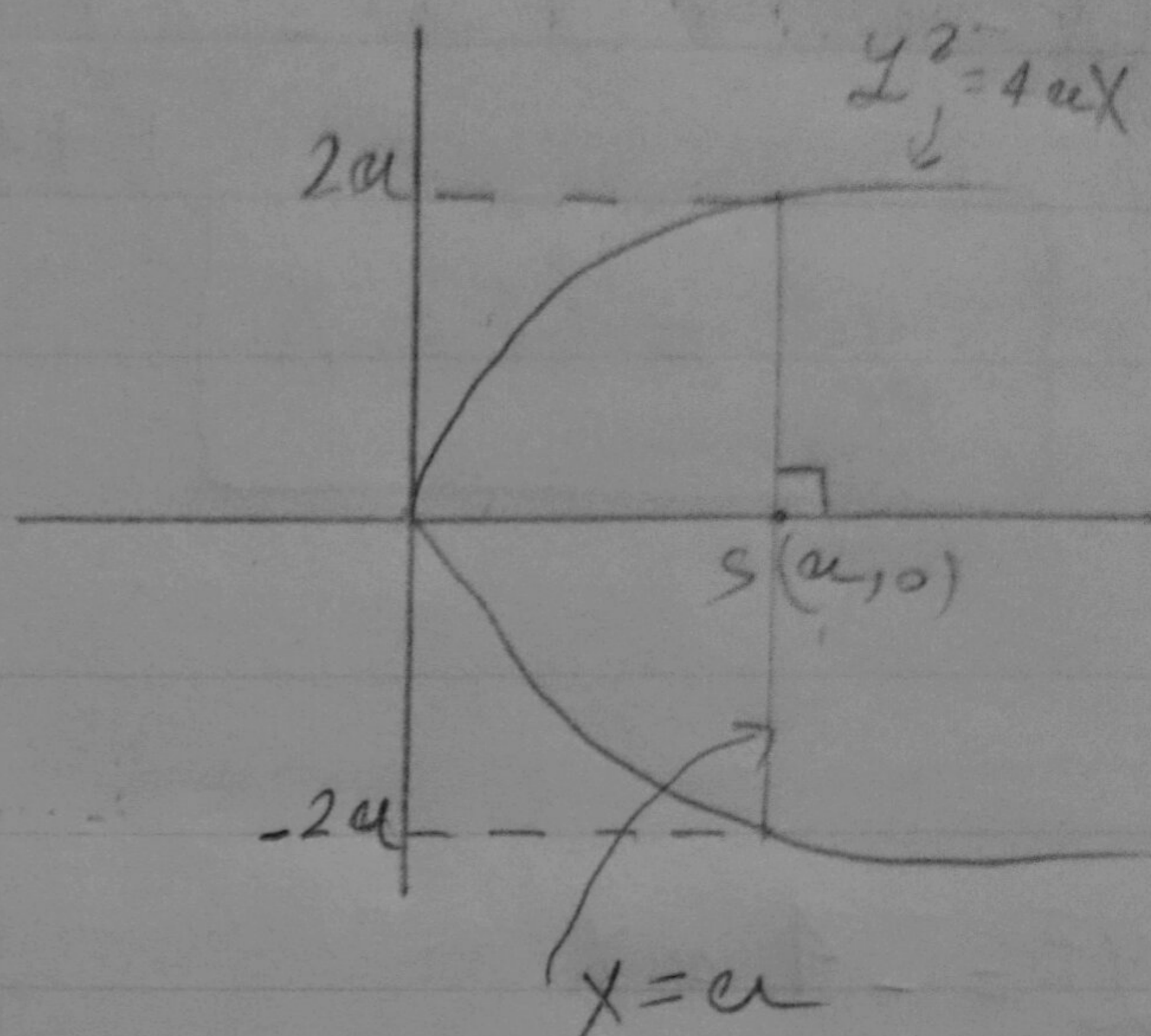


Latus rectum length: طول الوتر البؤري المحوري.

$$y^2 = 4ax^2$$

$$y = \pm 2ax$$

$$L.R. = 4a$$



EX: sketch the parabola

$$x^2 - 2x + 2y - 3 = 0$$

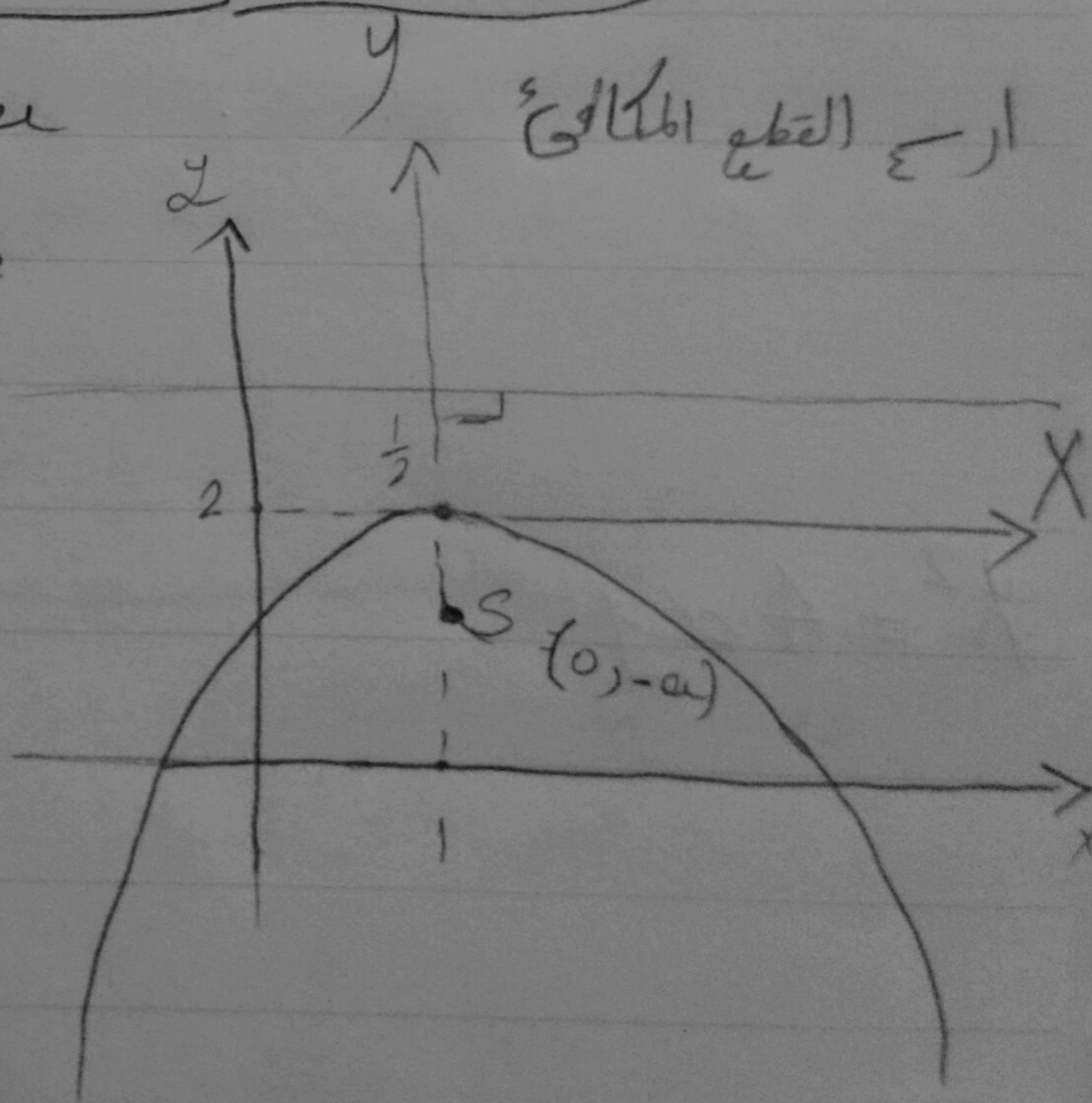
$$(x-1)^2 - 1 + 2y - 3 = 0$$

$$(x-1)^2 = -2(y-2)$$

$$\text{Let } \begin{cases} x = X + 1 \\ y = Y + 2 \end{cases}$$

$$X^2 = -2Y = -4aY$$

$$a = \frac{1}{2}$$





Subject.

Date.

$X, y$

$X, y$

New axis

old axis

Vertex

$(0, 0)$

$(1, 2)$

Focus

$(0, -\frac{1}{2})$

$(1, \frac{3}{2})$

directrix

$y = \frac{1}{2}$

$y = \frac{5}{2}$

L.r.L.

$= 4a = 4(\frac{1}{2}) = 2$



Subject. ....

Date. ....

EX: Find The eqn of The parabola that has its focus  
 $S(2, 3)$  and its directrix is the line  $x - 4y + 3 = 0$

Find L.H.L

$$\overline{PS}^2 = \overline{Pm}^2$$

$$(x - 2)^2 + (y - 3)^2 = \frac{(x - 4y + 3)^2}{1 + 16}$$

$$16x^2 + 8xy + y^2 - 74x - 78y + 212 = 0$$

$$a = 16 \quad h = 4, \quad b = 1$$

$$h^2 - ab = 16 - 16 = 0 \Rightarrow \text{parabola}$$

